

#3



Attorney Docket No. 08364.0034  
Customer Number 22,852

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: )  
Alan Edward GREEN et al. ) Group Art Unit: 2633  
Serial No.: 10/038,576 ) Examiner:  
Filed: January 8, 2002 )  
For: SIGNALLING SYSTEM )

**Assistant Commissioner for Patents  
Washington, DC 20231**

**BOX: MISSING PARTS**

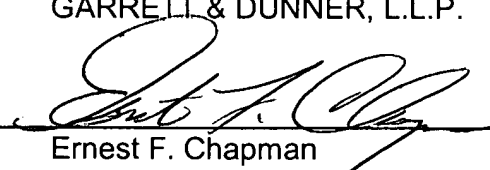
Sir:

**CLAIM FOR PRIORITY**

Under the provisions of 35 U.S.C. § 119, Applicants hereby claim the benefit of the filing date of British Patent Application No. 9916083.0, filed July 8, 1999, British Patent Application No. 9916084.8, filed July 8, 1999, British Patent Application No. 9916085.5, filed July 8, 1999, and British Patent Application No. 9916086.3, filed July 8, 1999, for the above-identified U.S. patent application.

In support of this claim for priority, enclosed is one certified copy of each of the priority applications.

Respectfully submitted,  
FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

By:   
Ernest F. Chapman  
Reg. No. 25,961

Dated: May 20, 2002

EFC/FPD/peg  
Enclosures

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I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

Signed

Dated

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Patents Form 1/77  
Patents Act 1977  
(Rule 16)



09JUL99 E460854-4 D02917  
P01/7700 0.00 - 9916083.0

## Request for grant of a patent

The Patent Office  
Cardiff Road  
Newport  
Gwent NP9 1RH

1.	Your reference	
	1830101/AM	
2.	Patent Application Number	
	9916083.0	
3.	Full name, address and postcode of the or of each applicant ( <i>underline all surnames</i> )	
	Scientific Generics Limited Harston Mill Harston Cambridgeshire CB2 5NH	
	Patents ADP number ( <i>if known</i> ) 5698574003	
	If the applicant is a corporate body, give the country/state of its incorporation	Country: ENGLAND State:
4.	Title of the invention	
	DUPLEX OPTICAL COMMUNICATION SYSTEM	
5.	Name of agent	Beresford & Co
	"Address for Service" in the United Kingdom to which all correspondence should be sent	2/5 Warwick Court High Holborn London WC1R 5DJ
	Patents ADP number 152600101	
6.	Priority details	
	Country	Priority application number
		Date of filing

**Patents Form 1/77**

**7. If this application is divided or otherwise derived from an earlier UK application give details**

Number of earlier of application

Date of filing

8. Is a statement of inventorship and or right to grant of a patent required in support of this request?

YES

9. Enter the number of sheets for any of the following items you are filing with this form.

Continuation sheets of this form

Description

2

Claim(s)

Abstract

Drawing(s)

1

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (*Patents form 7/77*)

1 + 2 COPIES

Request for preliminary examination and search (*Patents Form 9/77*)

Request for Substantive Examination (*Patents Form 10/77*)

Any other documents  
(please specify)

11. I/We request the grant of a patent on the basis of this application

Signature

  
BERESFORD & Co

Date 8 July 1999

12. Name and daytime telephone number of person to contact in the United Kingdom

ALAN MACDOUGALL

Tel:0171-831-2290

Patents Form 7/77  
Patents Act 1977  
(Rule 15)



**Statement of inventorship and of  
right to grant of a patent**

The Patent Office  
Cardiff Road  
Newport  
Gwent NP9 1RH

08 JUL 1999

1. Your reference  
**1830101/AM**

2. Patent Application Number  
accompanying application reference 1830101

**9916083.0**

3. Full name of the or each applicant  
**Scientific Generics Limited**

4. Title of the invention  
**DUPLEX OPTICAL COMMUNICATION SYSTEM**

5. State how the applicant(s) derived the right from the inventor(s) to be granted a patent  
**BY VIRTUE OF EMPLOYMENT.**

6. How many, if any additional Patents Forms  
7/77 are attached to this form?  
**NONE**

11. I/We believe that the person(s) named over the page (and on any extra copies of this form) is/are  
the inventor(s) of the invention which the above patent application relates to.

Signature

*Beresford & Co*  
**BERESFORD & Co**

Date 8 July 1999

12. Name and daytime telephone number of  
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Patents Form 7/77

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## **Duplex Optical Communication System**

### **Background**

The applicant has described in WO98/35328 an optical communication system employing a pixellated reflective modulator array combined with a telecentric optical system. The system operates by assigning each user of the system a unique pixel in the array. Each pixel in the array maps to a unique angular position in the field of view of the telecentric optical system (figure 1). The content of WO98/35328 is incorporated herein by way of reference.

Whilst a number of optical modulator technologies may be employed to produce systems according to WO98/35328, Quantum Confined Stark Effect (QCSE, sometimes also referred to as Self Electro-Optic Effect Devices or SEEDs) have advantages that they can operate at high bandwidths (in excess of 1GHz) and can be formed in large arrays.

Our invention concerns the use of such modulators in a duplex arrangement.

### **Description of the Invention**

Half duplex operation is described in WO98/35328 using a beamsplitting optical arrangement to split the beam from the exit pupil of the telecentric optical system between a modulator array and a spatially matched detectors array. Such an arrangement required that the two arrays be closely spatially matched, both in terms of their pitch, and their spatial position relative to the beam splitting optics.

According to our invention, we make use of the fact that the QCSE modulator structure is a p-i-n diode, the modulation capability arising from the presence of a quantum well stack in the intrinsic region of the diode (figure 2). The optical absorption of this quantum well stack is modified by applied electric field through the Stark effect. However, it is noted that the p-i-n diode structure also functions as a photodetector. Thus a half-duplex scheme is readily implemented using a single QCSE array.

In the following description, we refer to communication between the modulator and the receiver as the 'downlink' and between the receiver and the modulator as the 'uplink'. In a system according to our invention, the downlink is established by operating the receiver's laser in CW mode and by exploiting the modulation characteristic of the QCSE array (as described in WO98/35328). The uplink is established by applying modulation to the receiver's laser, and exploiting the photodetection characteristic of the QCSE array. A time division duplex scheme is implemented, in which uplink and downlink operate sequentially. The relative times for which uplink and downlink are active are chosen according to the data bandwidth

requirements in each direction. It will be obvious to those skilled in the art that the details of the design of the scheme will depend on the total bandwidth required, relative to the bandwidth limit imposed by the QCSE modulator and laser diode, and the latency of the system (determined by link delay due to the finite speed of light).

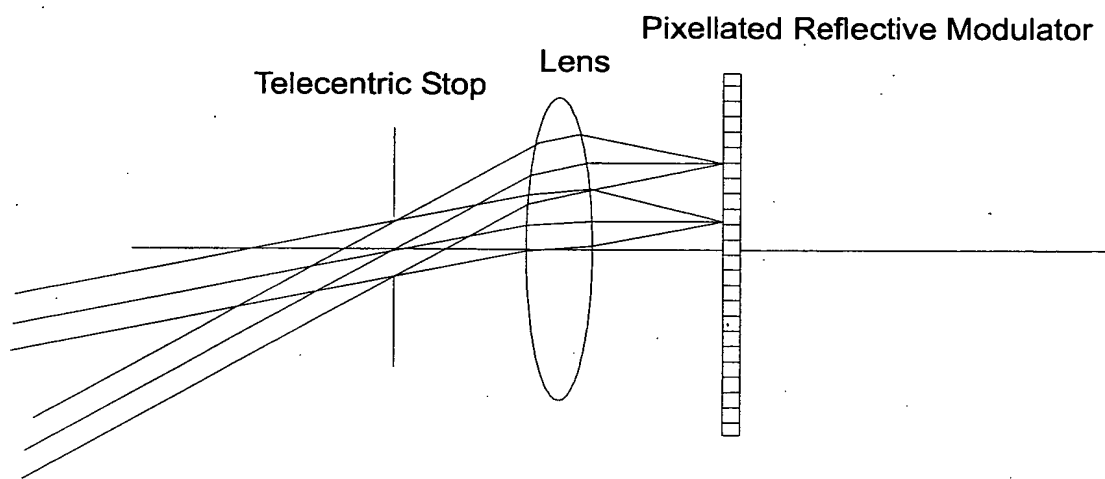


Figure 1

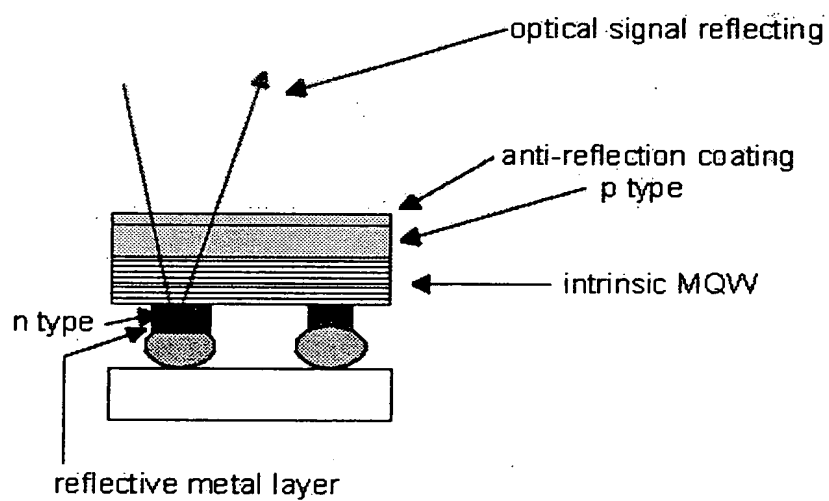


Figure 2



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SERIAL NO: 10/038, 576

DOCKET NO: 08364.0034